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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,312	10/23/2003	Don-Gyou Lee	8733.904.00-US	6396

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EXAMINER	
BODDIE, WILLIAM	
ART UNIT	PAPER NUMBER
2629	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,312	LEE ET AL.	
	Examiner	Art Unit	
	WILLIAM BODDIE	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *31-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *31-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In an amendment dated, April 6th, 2011 the Applicants amended claims 21-40 and added new claims 41-42. Currently claims 31-42 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 6th, 2011 has been entered.

Response to Arguments

Applicant's arguments filed April 6th, 2011 have been fully considered but they are not persuasive.

On page 7 of the Remarks, the Applicants argue that D'Souza does not disclose the newly added claim language requiring storage of the same initial gray scale value of R and/or G data and different levels when color reproducibility is reduced. The Applicants argue that D'Souza does not disclose any particular gray level associated with a gray scale value.

The Examiner respectfully disagrees. As detailed below in the updated rejections, D'Souza is seen to disclose the above discussed claim limitations. 502 in figure 5 represents the input gray level and the corresponding output gray scale values

are shown in 508. With such an understanding it should be clear that D'Souza does indeed disclose the discussed claim limitations.

As such the rejections have been updated to reflect the newly added claim limitations.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 31-35 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of D'Souza et al. (US 7,046,255) and further in view of Kimura et al. (US 6,008,786).

With respect to claim 31, Yui discloses, a display device (6 in fig. 1), comprising:

a display panel (6 in fig. 4),

a lookup table (9 in fig. 4) for storing a gray scale values data (output data in figs. 6a2-c2; col. 3, lines 58-65) of image information including R. G and B data (RGB input data in fig. 4), and storing a gray scale value of a gray level of the B data (fig. 6C1-2) prior to a gray level at which a color reproducibility is reduced (col. 4, lines 26-33; also note 21 in fig. 4; the display color space in figs. 5a-c; controller 7 determines the level at which color reproducibility is reduced col. 4, lines 26-37, 57-67), as a gray scale value of gray levels from the gray level at which the color reproducibility is reduced to an

uppermost gray level (clear from figs. 6a-c that the stored gray scale value (output data) is the maximum gray scale value accurately displayable by the display panel);

a data processing unit for compensating image information according to the gray scale values in the lookup table (3, 5 and 7 in fig. 4, for example); and

a data driving unit (5 in fig. 4) for receiving the compensated image information and applying the compensated image information to the display (col. 2, lines 45-48).

D'Souza discloses, an LCD display (col. 4, lines 60-63), wherein a lookup table includes a same initial gray scale value of at least one of the R and G data for all gray levels prior to a gray level at which a color reproducibility is reduced (prior to B level 30 in 508 of fig. 5; both R and G are 0) and the lookup table includes different gray scale values of the R and G data to mix with the B gray scale values from a gray level at which the color reproducibility is reduced to an uppermost gray level (note the compensation amounts of R levels in 508 during reduced B reproducibility).

D'Souza and Yui are analogous art because they are from the same field of endeavor namely, gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

Neither D'Souza nor Yui expressly disclose, that the display panel the control circuitry for an LCD panel.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), comprising:

a liquid crystal panel having a plurality of gate lines and data lines (Y and X lines, respectively in fig. 1) crossing each other and having red (R), green (G) and blue (B) pixels (col. 1, lines 46-47) arranged in a matrix pattern (col. 1, lines 21-26);

a light source transmitting light through the R, G, and B pixels creating red, green, and blue colors respectively (col. 2, lines 5-8, for example);

a gate driving unit for applying scan signals to the gate lines (5 in fig. 1; col. 1, lines 33-36); and

a data driving unit for receiving compensated image information and applying the compensated image information to the data lines (3 in fig. 1; col. 1, lines 31-33).

D'Souza, Kimura and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption, decreased cost and fast response (Kimura; col. 1, lines 16-20).

With respect to claim 32, Yui, D'Souza and Kimura disclose, the device of claim 31 (see above).

Yui further discloses, wherein the gray scale value of the gray levels of the B data prior to a gray level at which a color reproducibility is reduced is the same as the gray scale value of the bits from the gray level at which a color reproducibility is reduced to the uppermost gray level (note the figures in fig. 6a-c; which clearly show the gray

scale value at all points after color reproducibility is reduced is the same as the immediately previous value).

With respect to claims 33-35, Yui, D'Souza and Kimura disclose, the LCD device of claim 31 (see above).

Neither Yui nor D'Souza expressly disclose a set of 64 gray scale levels.

Kimura discloses the use of 64 gray scale levels (col. 4, lines 38-44; and col. 1, lines 52-56).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the 255 levels of Yui with the 64 of Kimura for the well-known benefits of reduced memory requirements and processing speed thereby resulting in reduced cost.

It is clear from figures 6A-2-6C-2 of Yui that once the input gray scale levels reach a certain level (based on the reproducibility of the device), that level is maintained until the maximum gray scale level.

With the conversion of Yui to a 64 level gray scale the clipped portion in figure 6 would likely begin close to a 52^{nd} gray scale level. More importantly, if the color reproducibility of the display required that the gray scale be clipped at the 52^{nd} level then the disclosure of Yui could clearly accommodate that.

Furthermore, lacking a definite advantage of freezing grayscale values at the 52^{nd} level in the current invention, there does not appear to be any reason for specifically selecting the 52^{nd} level versus the 51^{st} or 50^{th} levels. This selection appears to be entirely predicated on at what level the color reproducibility begins to decrease.

As Yui discloses adjusting the clipping of the gray scale based on the color reproducibility of the device, Yui is seen as sufficiently anticipating this limitation of claim 25.

With respect to claim 41, Yui, D'Souza and Kimura disclose, the liquid crystal display device of claim 41 (see above).

Yui, when combined with D'Souza, further discloses, wherein the lookup table includes the same initial gray scale value for both R and G data (D'Souza; seems clear from 508 in fig. 5, that all the other initial gray scale values for R and G prior to a gray level of B-30 are 0).

5. Claims 36-40 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of D'Souza et al. (US 7,046,255) and further in view of McKinnon et al. (US 6,227,668).

With respect to claim 36, Yui discloses, a method for improving a color reproducibility of a display device (6 in fig. 1), the method comprising:

detecting a gray scale level of a gray level at which color reproducibility is reduced, and a gray scale value of a gray level prior to the gray level at which a color reproducibility is reduced (note 21 in fig. 4; the display color space in figs. 5a-c; controller 7 determines the level at which color reproducibility is reduced col. 4, lines 26-37, 57-67);

storing the gray scale value of the gray level of the B data prior to the gray level at which a color reproducibility is reduced, as a gray scale value of bits from the gray level at which color reproducibility is reduced to an uppermost gray level (clear from

figs. 6a-c that the stored gray scale value (output data) is the maximum gray scale value accurately displayable by the display panel; col. 4, line 57 – col. 5, line 11);

compensating the image information according to the gray scale value (clear from figs. 6a-c2 that the B color level has been analyzed and compensated); and

applying the compensated image information to the display panel (6 in fig. 1).

Yui does not expressly disclose the method of determining the point of color reproducibility reduction nor the use of a LCD.

D'Souza discloses a LCD display (col. 4, lines 60-63) driving method comprising:

storing a same initial gray scale value of at least one of the R and G data for all gray levels prior to a gray level at which a color reproducibility is reduced (prior to B level 30 in 508 of fig. 5; both R and G are 0) and including different gray scale values of the R and G data to mix with the B gray scale values from a gray level at which the color reproducibility is reduced to an uppermost gray level (note the compensation amounts of R levels in 508 during reduced B reproducibility); and

compensating the image information (input R,G,B in fig. 2) according to the gray level and mixing the gray scale values of at least two of R, G, and B data (506 values in fig. 5; specifically note the clipped B values and corresponding R and G values).

D'Souza and Yui are analogous because they are from the same field of endeavor namely, gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to use the image processing of Yui in an LCD taught by D'Souza.

The motivation for doing so would have been, to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

Neither D'Souza nor Yui expressly disclose how the detection is carried out.

McKinnon discloses, measuring color reproducibility of a display by measuring a color displayed on the display panel with increasing gray scale values of the B color is increased (col. 3, lines 20-27; specifically note step (ii)).

McKinnon, D'Souza and Yui are analogous because they are from the same field of endeavor namely, gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to perform the detecting step in the display of D'Souza and Yui as taught by McKinnon.

The motivation for doing so would have been to precisely determine the threshold level (McKinnon; col. 3, lines 26-27).

With respect to claim 37, Yui, D'Souza and McKinnon disclose, the device of claim 36 (see above).

Yui further discloses, wherein the gray scale value of the gray levels of the B data prior to a gray level at which a color reproducibility is reduced is the same as the gray scale value of the bits from the gray level at which a color reproducibility is reduced to the uppermost gray level (note the figures in fig. 6a-c; which clearly show the gray scale value at all points after color reproducibility is reduced is the same as the immediately previous value).

With respect to claims 38-40, Yui, D'Souza and McKinnon disclose, the LCD device of claim 36 (see above).

Yui does not expressly disclose a set of 64 gray scale levels.

Kimura discloses the use of 64 gray scale levels (col. 4, lines 38-44; and col. 1, lines 52-56).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the 255 levels of Yui with the 64 of Kimura for the well-known benefits of reduced memory requirements and processing speed thereby resulting in reduced cost.

It is clear from figures 6A-2-6C-2 of Yui that once the input gray scale levels reach a certain level (based on the reproducibility of the device), that level is maintained until the maximum gray scale level.

With the conversion of Yui to a 64 level gray scale the clipped portion in figure 6 would likely begin close to a 52nd gray scale level. More importantly, if the color reproducibility of the display required that the gray scale be clipped at the 52nd level then the disclosure of Yui could clearly accommodate that.

Furthermore, lacking a definite advantage of freezing grayscale values at the 52nd level in the current invention, there does not appear to be any reason for specifically selecting the 52nd level versus the 51st or 50th levels. This selection appears to be entirely predicated on at what level the color reproducibility begins to decrease. As Yui discloses adjusting the clipping of the gray scale based on the color

reproducibility of the device, Yui is seen as sufficiently anticipating this limitation of claim 25.

With respect to claim 42, Yui, D'Souza and Kimura disclose, the method of claim 36 (see above).

Yui, when combined with D'Souza, further discloses, wherein the initial gray scale value is the same for both R and G data (D'Souza; seems clear from 508 in fig. 5, that all the other initial gray scale values for R and G prior to a gray level of B-30 are 0).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM BODDIE whose telephone number is (571)272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William L Boddie/
Primary Examiner, Art Unit 2629
5/4/2011